

## **Impact of lightning-NO emissions on summertime U.S. photochemistry as determined using the CMAQ model with NLDN-constrained flash rates**

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Lightning-NO emissions are responsible for 15-30 ppbv enhancements in upper tropospheric ozone over the eastern United States during the summer time. Enhancements vary from year to year but were particularly large during the summer of 2006, a period during which meteorological conditions were particularly conducive to ozone formation. A lightning-NO parameterization has been developed that can be used with the CMAQ model. Lightning-NO emissions in this scheme are assumed to be proportional to convective precipitation rate and scaled so that monthly average flash rates in each grid box match National Lightning Detection Network (NLDN) observed flash rates after adjusting for climatological intracloud to cloud-to-ground (IC/CG) ratios. The contribution of lightning-NO emissions to eastern United States NO<sub>x</sub> and ozone distributions during the summer of 2006 will be evaluated by comparing results of 12-km CMAQ simulations with and without lightning-NO emissions to measurements from the IONS field campaign and to satellite retrievals from the Tropospheric Emission Spectrometer (TES) and the Ozone Monitoring Instrument (OMI) aboard the Aura satellite. Special attention will be paid to the impact of the assumed vertical distribution of emissions on upper tropospheric NO<sub>x</sub> and ozone amounts.